

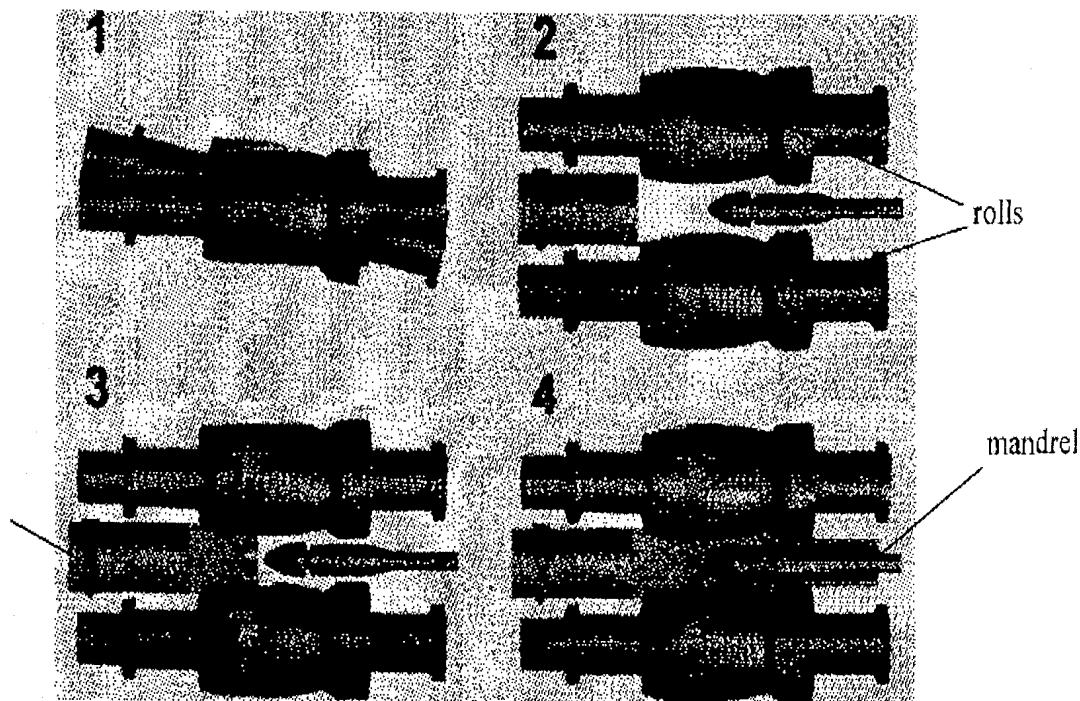
lifetime. To avoid enlarged pipe end section weakening, cylindrical pipes having wall thicknesses selected depending on the required enlarged diameters for the sockets have been used. With this approach, however, the wall thicknesses apart from the sockets are greater than necessary, which leads to increased material consumption and costs.

It is possible, with the claimed invention, to enlarge the diameter of a pipe end section without increased material consumption or costs. The pipe end section inner and outer diameters are enlarged by introducing an expansion tool into the pipe end and concurrently creating an upsetting force on the axial edge or end of the pipe. Due to the upsetting force, reduction of the wall thickness in the enlarged end section is avoided. In the upsetting step, the axial length of the enlarged portion is reduced, thereby increasing the wall thickness. The outer diameter is defined and limited by the upsetting device together with the shaping shoe.

The Examiner takes the position that the present invention is obvious in view of the collective disclosures of the Takeuchi et al. and Drillon et al. patents. It is apparent from Figures 2(A) through 2(D) of the Takeuchi et al. disclosure and the related description that there is no intent to increase the inner and outer diameters of a pipe end section; instead, as discussed in column 2, lines 1-6, and column 2, line 48 to column 3, line 6, a ramp-like inner taper 5 having an accurate shape is to be created. The Takeuchi et al. disclosure thus teaches creating a reduction of the inner diameter of a pipe provided with an accurately-shaped tapered section. The present invention, by contrast, addresses the problem of expanding pipe end section inner and outer diameters in order to

create a socket without weakening that end section. There is no contemplation of such expansion in the disclosure provided by the Takeuchi et al. patent.

The method of producing a tube disclosed by the Dillon et al. patent is completely different from both the Takeuchi et al. method and the present invention. The Dillon et al. patent concerns a rolling procedure performed by a pilgrim rolling mill. The following schematic illustration of a mandrel used to roll a pipe end section generally shows such a method.



The shaping of the pipe end section is achieved by continuously rotating rolls, which define the outer shape of the pipe, whereas the inner diameter can be defined by a mandrel introduced into the pipe (compare also lines 4-41 in column 6 of the Dillon et al. patent). Such a manufacturing procedure is not used for enlarging pipe end sections. Instead the outer diameter of the pipe is at least partly reduced.

Both references relied on to reject claims 9 and 16 thus refer to methods for reducing and shaping the inner diameters of original pipe blanks. Even if a person skilled in the art could combine the two references relied on, that person would not arrive at the present invention. By way of the present invention, a socket having increased inner and outer diameters is produced. This is not the case according to the collective disclosures provided by the Takeuchi et al. and Drillon et al. patents.

U.S. Patent 4,295,357 to Roper, relied on together with the Takeuchi et al. and Drillon et al. disclosures in section 5 on page 3 of the Office Action, may be the most relevant prior art document. The Roper patent discloses a method and an apparatus for enlarging the inner and outer diameters of a pipe end section, as shown, for example, in Figures 7 and 8. Unlike the present invention, however, the pipe end is bent outward so as to form a ring-shaped flange at the end of the pipe. An upsetting force to increase the wall thickness is not disclosed; due to the small increases in the inner and outer diameters of the pipe end section, the decrease in wall thickness is sufficiently small that it does not weaken the pipe remarkably. One skilled in the art, therefore, would not have been motivated to provide any additional means or steps to strengthen the enlarged pipe section.

For reasons discussed, it is respectfully submitted that the newly cited prior art relied on by the Examiner, considered collectively, fails to suggest a socket making method by an at least single-step expansion of a pipe end with a large jump in diameter, comprising, in combination with the "introducing" act or operation specified, expanding a region of the pipe end to provide an expanded

region of the pipe end with an enlarged wall thickness as particularly defined by claim 9 as it presently appears in this application. For the same reasons, it is respectfully submitted that the newly cited prior art relied on by the Examiner, considered collectively, fails to suggest an apparatus for making a socket on a pipe end having an expanded region with an enlarged wall thickness, comprising, in combination with the other elements specified, a substantially cylindrically structured upsetting device having a substantially radially extending annular shoulder which is pressable axially against an end face of the pipe end during an upsetting step to produce the expanded region with the enlarged wall thickness as defined by claim 16 as it presently appears in the application. Claims 9 and 16 currently in the application should be patentable as a result. The rest of the claims in this application are dependent claims and should be patentable as well for the same reasons.

The present application, as a whole, should now be allowable for reasons discussed. If there are any questions regarding this Reply or the application in general, a telephone call to the undersigned would be appreciated since this should expedite the prosecution of the application for all concerned.

If necessary to effect a timely response, this paper should be considered as a petition for an extension of time sufficient to effect a timely response. Please charge any deficiency in fees or credit any overpayments to Deposit Account No. 05-1323 (Docket # 102475.57672US).

January 11, 2010

Respectfully submitted,

Richard R. Diefendorf  
Registration No. 32,390

CROWELL & MORING LLP  
Intellectual Property Group  
P.O. Box 14300  
Washington, DC 20044-4300  
Telephone No.: (202) 624-2500  
Facsimile No.: (202) 628-8844  
RRD:rd